IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant(s):	Ralph Bauer et al.		
Title:	SURFACE COATING SOLUTION		
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Examiner:	Tae H. Yoon	Group Art Unit:	1796
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Commissioner for Patents
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DECLARATION UNDER 37 C.F.R. §1.132

Sir, I hereby declare and state:

1. I am an employee of Specialty Coating Services, Inc.

2. I have been engaged in research and product development of water-based and high solids surface coating formulations for 31 years.

3. Saint-Gobain Ceramics & Plastics, Inc. has engaged my services to prepare and test surface coating solutions.

4. I have reviewed the cited references: Elsik et al. (US 5,550,180, hereinafter "Elsik"), Bugosh (US 2,915,475) and Gernon et al. (US 2006/0106129, hereinafter "Gernon").

5. Background

As I understand it, the present application is directed to a surface coating solution, such as a paint or enamel, that includes a water-based solution including a polymer in an emulsion and activated boehmite particles provided in the water-based solution in an amount of 0.1 wt% to 20.0 wt%. The activated boehmite particles include mainly anisotropically shaped particles having an

aspect ratio of at least 3:1. The surface coating solution has a stabilized flow and leveling of at least 6 and has a stabilized SAG resistance of at least 7 mils. The surface coating solution is free of associative thickener. The surface coating solution can be a water-based paint, enamel, or adhesive.

6. Rheology Modifiers

The activated bochmite in the present water-based solution is one of many types of rheology modifiers that can be used in formulations to provide the desired shelf stability and application properties to a given paint, coating, or adhesive. Rheology modifiers are also often referred to as thickeners, with those that are shear thinning commonly being referred to as thixotropes within the coatings adhesives, sealants and adhesives (C.A.S.E.) markets. Such rheology modifiers come in various forms including dry powders, solutions, and emulsions with chemistries, including, but not limited to: modified hydroxethyl-cellulose or hydroxymethylcellulose (HEC and HMC), betonite based oragano-clays, alkali soluble or swellable emulsions (ASE), water-soluble/dispersible polymers commonly referred to as "associative thickeners", and boehmites.

There are basically two types of associative thickeners: 1) non-ionic hydrophobically modified ethylene-based-oxide based urethane block copolymers (HEUR), and 2) anionic hydrophobically modified alkali soluble acrylic copolymers (HASE).

These rheology modifiers are designed for use in water-based paint, coating, or adhesive compositions, although the degree of compatibility and efficacy can vary greatly depending on the type of paint or the other ingredients in the formulation. In addition, the various types of rheology modifiers are designed to impart various degrees of rheology ranging from near Newtonian to shear thinning or thixotropic, depending on the modifier type and grade. Thus, there are many modifier choices available to the formulator, with selection being dependent on the degree of sag control or flow desired. In most cases, the supplier of the rheology modifier provides guidelines for their use, including the paint/polymer types known to be compatible with the modifier, recommended use ranges, and where it should be introduced to the formulation (order of addition).

Paint, enamel and adhesive, particularly in view of the tested flow and leveling, are not intended for coating skin. Flow and leveling as determined by ASTM D2801 is a testing method for architectural and industrial paint, enamel, and related surface coatings. Such paints are not cosmetics, but instead relate to architectural coatings or industrial coatings.

7. Measurements of Sag Resistance and Flow and Leveling are made on Equilibrated Compositions

After coating solutions, such as paints and enamels, are prepared, the rheology changes rapidly over an initial period and subsequently stabilizes, or equilibrates, in the aqueous medium typically within 18 to 24 hours. After equilibrating, the properties of the coating solutions remain relatively constant for an extended period, typically months or years depending on the product type. Generally, rheological properties measured at a time after 24 hours, such as 72 hours or a week, are constant.

In the present specification, the changing rheology is demonstrated in FIG. 1. The viscosity of the solution after 2 hours is different than the equilibrated viscosity, measured at 72 hours. The viscosity if measured at 24 hours would be close to if not the same as that measured at 72 hours, indicating that the mixture stabilized or equilibrated.

It is well understood that properties, such as Sag Resistance and Flow and Leveling, are measured on equilibrated solutions after the initial period. In fact, the ASTM standard (D2801) for flow and leveling specifies that the test be performed after an initial period, which allows for an equilibration time. The need for an equilibration period, such as that referenced in ASTM D2801, is well understood in the surface coating arts.

In Example 2 of the present specification, coatings are applied at the "formulated coating viscosity, without reduction of pH." Present Specification, par. [0038]. It is understood that the formulated coating viscosity is the viscosity after the rheological properties stabilize.

As demonstrated by the data illustrated in TABLE 2 of the Declaration of February 2, 2009, the properties measured at 24 hours and measured at 1 week are the same for most of the samples and change only slightly for one sample (Catapal D), indicating that the samples had stabilized, or equilibrated, at 24 hours. The Catapal D sample demonstrated only a slight change (1 pt) in

SAG resistance and flow and leveling over the 6 day period between the first measurement and the second measurement. The SAG resistance at both 24 hours and 1 week were lower than 7.

As such, it is clear from the specification and subsequently supplied examples that SAG resistance and flow and leveling are measured on stabilized/equilibrated coating solutions.

8. Knowledge of Coating Solutions is High

The coating solution arts for water-based systems were mature at the time of filing the Present Application as evidenced by the numerous types of commercially available rheology modifiers and other components commonly used in paints, enamels, and adhesives. The properties and influence of conventional components on surface coating solutions was understood and well documented by suppliers. In addition, suggested formulations were provided by latex suppliers.

The cited references provide evidence of maturity in the art. Bugosh issued in 1959 and Napier (US 3,357,791) issued in 1967, which relate to fibrous alumina monohydrate for use in coatings. In addition, the PTO has cited references, such as Elsik issued in 1996 and Gernon published in 2006, which are directed to latex formulations. Specifically, Elsik discloses alumina thickened latex formulations, and Gernon discloses formulations thickened with associative thickeners. Furthermore, the recited properties of flow and leveling and SAG resistance were well-known properties, having been specified in ASTM standards.

As indicated in the attached brochure for UCAR Latex 379G, used in the examples of Gernon (US 2006/0106129), latex suppliers typically provide example formulations. Formulators generally use the example formulation as a starting point, performing additional experimentation to refine the formulation as desired.

Similarly, suppliers of other components, such as surfactants, defoamers, pigments, preservatives, and dispersants, provide suggested usage and recommended levels. For example, the attached brochure for BYK-1650 Defoamer, used in the examples of Gernon, provides supplier recommendations for use in particular types of surface coating solutions at recommended levels. Guidance regarding usage of such other components can be further drawn from example formulations provided by the latex suppliers. See, for example, the brochure for UCAR Latex 379G, which lists similar components to Gernon.

As such, the base properties of various conventional surface coating components were well understood. As illustrated in the brochure, manufacturers even provide example formulations and properties in technical data sheets and brochures, making it easy for formulators to select a base formulation from which to start. For example, the UCAR Latex 379G provides example formulations for paints and enamels.

Furthermore, a tradeoff between properties, such as SAG resistance and flow and leveling, when conventional thickeners are used, is generally recognized. As illustrated in the previously provided testing of Examples of Elsik in Tables 5 and 6 (excerpt provided below for convenience) of the Declaration submitted August 17, 2009, the values of flow and leveling and SAG resistance clearly have an inverse relationship. When SAG resistance is low, flow and leveling is high, and when SAG resistance is high, flow and leveling is low. In particular, when SAG resistance is 5 or less, as illustrated in Table 5, flow and leveling is 5 or higher. However, when SAG resistance is 8 or higher, flow and leveling is around 1 or 2, as illustrated in Table 6. As noted previously, the measured values are stabilized values, rendering them comparable to other values of record. Thus, it was understood that the concentration of conventional thickeners can be changed to acquire a desired property (flow and leveling or SAG resistance) to the detriment of the other.

TABLE 1. Excerpt taken from Table 5 provided in the Declaration dated August 17, 2009

Property	Alumina (P2)	HEC + Alumina (P2)
Stormer Viscosity (K.U.)	63 K.U.	85 K.U.
Brookfield Viscosity (cps)		
20 RPM	990	3085
50 RPM	554	1830
100 RPM	400	950
Recovery Time	9 minutes	2.5 minutes
SAG Resistance	< 1 mil	5 mils
Flow and Leveling	6	5

TABLE 2. Excerpt taken from Table 6 provided in the Declaration dated August 17, 2009

Property	HEC	HEC + Alumina (P2)
Stormer Viscosity (K.U.)	95 K.U.	76 K.U.
Brookfield Viscosity (cps)		
20 RPM	5220	2350
50 RPM	3200	1256
100 RPM	2140	845
Recovery Time	55 seconds	2.0 minutes
SAG Resistance	12+ mils	8 mils
Flow and Leveling	1	2

As such, knowledge of coating solutions and the influence of conventional components on such coating solutions was high and mature at the time the present application was filed. With regard to components of conventional coating solutions, the influence of such components was well understood and predictable, particularly in light of manufacture suggested formulations and manufacture supplied property data.

Given the broadly accessible information about the behavior of components within surface coating solutions, it would not have been complex to formulate a paint composition having the recited flow and leveling and SAG resistance after reading the present specification. Upon education as to the nature of a particular thickener, such as the activated boehmite thickener of the present specification (See Table 1 of the Present Specification), and its relationship to

properties of the surface coating, a reasonable amount of experimentation could have been performed to produce a surface coating commensurate in scope with the invention. That is, after reading the present specification, it would not have been complex to formulate a surface coating solution using the present activated boehmite, given the recommended method of incorporation and use level guidelines.

9. Considerable Experimentation is Typical

When developing a commercial formulation for a surface coating solution, the surface coating industries typically perform a considerable number of experiments. While various manufacturers of components provide guidance regarding the use of each component, it is typical to run a considerable number of experiments, varying the concentration of many of the components to assess numerous properties of the formulations. Such experimentation leads to formulations that adjust the properties within the range of the base formulation, while adjusting the paint rheology to meet the needs of the application (i.e., brush and roll or spray).

Depending on the type of surface coating solutions, a variety of properties are measured that relate to storage, application, durability, and appearance of the surface coating solution. See, for example, the brochure for UCAR Latex 379G, for exemplary properties desirable in different surface coating solutions. Different components are known to influence one or more properties. Experiments quantify the influence in conjunction with other components that also influence similar properties. Thus, many variations are tested to formulate a surface coating solution having properties desirable for the particular use of the surface coating solution.

The complexity of performing such experimentation is low for one educated in the art. Typically, a grind solution is prepared from which the surface coating is prepared during a letdown step. The latex polymer is added during the letdown step. Such a two step process is well understood. When particular components are added, such as the latex polymer, it is well understood that order can be important. In addition, a three step process is well understood to those familiar with rheology modifiers such as the HECs and organo-clays designed for use in paints, enamels, and adhesives.

In view of the present specification, the process is a three step process including both a grind and a letdown step. The boehmite is first activated and then used during the grind step. As such, experimentation relating to formulating the recited composition is not complex, adding at most a simple mixing step to an already well understood process.

Accordingly, considerable experimentation is typical when formulating a surface coating. However, such experimentation is not complex.

10. Prior Art

The cited references do not provide sufficient teaching to formulate a surface coating solution having the recited flow and leveling and SAG resistance, particularly in the absence of associative thickener and in light of the properties of the Examples of Elsik.

Elsik is directed to latex compositions including, as a rheology modifier, a boehmite alumina. *Elsik*, Abstract. In Examples 1-4, Elsik discloses use of Disperal Sol P2 in amounts of around 0.22 wt% to 0.7 wt% in an acrylic-vinyl chloride modified latex. In Example 5, Elsik provides the properties of other boehmite alumina, such as Disperal and Catapal D.

As demonstrated in the testing provided in the Declaration of August 17, 2009 (See Tables 1 and 2 above), samples formulated in accordance with Examples 1 and 3 of Elsik that include alumina particulate do not have both flow and leveling of at least 6 and SAG resistance of at least 7 mils. Instead, the Disperal P2 samples, even when activated, exhibit poor flow and leveling, and the Disperal and Catapal D samples exhibit poor SAG resistance.

Bugosh is directed to fibrous aluminum monohydrate particles. Bugosh further discloses that fibrous boehmite can be used as reinforcing filler in making plastic films, coatings, paints, adhesives, or other plastic articles. The fibrous boehmite may be mixed with aqueous dispersions of polymers. *Bugosh*, col. 29, ll. 1-21. Bugosh is silent regarding composition of the coatings and paints and is silent regarding characteristics of the coatings and paints, such as flow and leveling, SAG resistance, and set-to-touch dry time characteristics. While, as disclosed by Bugosh, it may have been known to incorporate boehmite into coatings, paints, and adhesives, Bugosh is silent regarding activating the boehmite particulate and is silent regarding the process for combining boehmite particulate with aqueous dispersions of polymers.

Gernon is directed to latex paint formulations that contain N-n-butyl ethanolamine (BAE) as a neutralizing agent. Gernon discloses a flat interior paint that includes a Polyphobe 102 rheology modifier and other coatings that include RHOPLEX® or Acrysol® rheology modifiers. Polyphobe and Acrysol are lines of associative thickeners. The flat interior paint reportedly exhibits a leveling of 8. Gernon does not disclose the use of a boehmite rheology modifier. Given that the associative thickeners of Gernon influence the leveling properties, removing the associative thickener or exchanging the associative thickener for a different thickener would change the leveling. It would have been understood at the time the present application was filed that the leveling property of the formulation of Gernon would not necessarily be present in a different formulation, particularly one using a different thickener.

In particular, replacing a thickener of Gernon with an anisotropic boehmite would influence the properties of the modified Gernon paint, particularly SAG, leveling, pH, and viscosity. Accordingly, replacing the thickener of Gernon would not necessarily provide a latex paint having desirable SAG resistance and flow and leveling, or even desirable pH, or viscosity.

As such, Elsik fails to disclose a formulation necessarily having the recited flow and leveling and SAG resistance. Bugosh provides no specific teaching regarding the influence of anisotropic boehmite on paint properties. Gernon discloses formulations including associative thickeners and does not disclose the influence of non-associative thickeners on flow and leveling and SAG resistance. As such, it would not have been expected that the properties of Gernon or the recited flow and leveling and SAG resistance could be imparted to Elsik even with the addition of the boehmite of Bugosh, particularly in the absence of associative thickener.

11. Summary

As I understand it, the present application is directed to a surface coating solution, such as a paint or enamel, that includes a water-based solution including a polymer in emulsion form and activated boehmite particles provided in the water-based solution in an amount of 0.1 wt% to 20.0 wt%. The activated boehmite particles include mainly anisotropically shaped particles having an aspect ratio of at least 3:1. The surface coating solution has an equilibrated flow and leveling of at least 6 and has a stabilized SAG resistance of at least 7 mils. The surface coating

solution is free of associative thickener. The surface coating solution can be paint, enamel, or adhesive. Such paint is not a cosmetic.

It was well known that flow and leveling, SAG resistance and other properties are measured on stabilized, or equilibrated, formulas. Formulas equilibrate within 18 to 24 hours, providing constant properties over an extended period following stabilization.

The skill in the surface coating arts is high and the surface coating arts are mature. Nevertheless, performing experimentation is common as it is this experimentation that allows the coatings manufacturer to create a product with unique features for a given use. Given the broadly accessible information about the behavior of components within surface coating solutions, it would not have been complex to formulate a paint composition having the recited flow and leveling and SAG resistance after reading the present specification.

12. I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true, and further, that these statements were made with the knowledge that willful false statements and the like, so made, are punishable by fine or imprisonment, or both, under 18 U.S.C. 1001 and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

Respectfully submitted,

December 6, 2010
Date

Mike Jackson